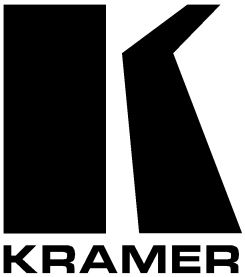
# Kramer Electronics, Ltd.




# USER MANUAL

## Model:

**VP-8x8**

***8x8 VGA / UXGA Matrix Switcher***

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# 1 Introduction

Welcome to Kramer Electronics (since 1981): a world of unique, creative and affordable solutions to the infinite range of problems that confront the video, audio and presentation professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 350-plus different models now appear in 8 Groups[1], which are clearly defined by function.

Congratulations on purchasing your **VP-8x8** *8x8 VGA / UXGA Matrix Switcher*, which is ideal for the following typical applications:

- Any professional display system requiring a true 8x8 computer graphics matrix operation
- Multimedia and presentation source, and acceptor selection

The package includes the following items:

- **VP-8x8** *8x8 VGA / UXGA Matrix Switcher*
- Power cord and Null-modem adapter
- Windows®-based Kramer control software[2]
- Windows®-based Configuration Manager XPort software and Com Port Redirector
- Kramer **RC-IR1** Infra-Red Remote Control Transmitter[3] (including the required battery and a separate user manual[4])
- This user manual[4]

# 2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[5]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Video and Audio Switchers, Matrix Switchers and Controllers; GROUP 3: Video, Audio, VGA/XGA Processors; GROUP 4: Interfaces and Sync Processors; GROUP 5: Twisted Pair Interfaces; GROUP 6: Accessories and Rack Adapters; GROUP 7: Scan Converters and Scalers; and GROUP 8: Cables and Connectors

2 Downloadable from our Web site at http://www.kramerelectronics.com

3 Previously known as the IR-1 / IR-1-01

4 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

5 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

# 3 Overview

The **VP-8x8** is a high performance 8x8 RGBHV Matrix Switcher for high resolution video. The **VP-8x8** lets you simultaneously route any or all of the 8 inputs to any or all of the 8 outputs.

The **VP-8x8** *8x8 VGA / UXGA Matrix Switcher*:

- Has a video bandwidth of 400MHz that ensures transparent performance even in the most critical applications
- Has 16 preset memory locations for quick access to common configurations
- Has a delayed switching mode (ranging from 0 to 3.5sec[1]) for clean transitions (seamless switching) when switching between non-genlocked sources
- Has DC coupled inputs and outputs
- Includes a TAKE button, which allows you to place multiple switches in a queue and then activate them simultaneously with one touch of this button
- Consists of a LOCK button to prevent tampering with the front panel
- Automatically detects connected input signals (respective button illuminates)

Control the **VP-8x8** using the front panel buttons, or remotely via:

- RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer Infra-Red remote control transmitter
- Ethernet

The **VP-8x8** is dependable, rugged, and fits into one vertical space (1U) of a standard 19" professional rack[2]. To achieve the best performance:

- Connect only good quality connection cables, thus avoiding interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VP-8x8** away from moisture, excessive sunlight and dust

# 4 Your VP-8x8 8x8 VGA / UXGA Matrix Switcher

Figure 1, Table 1 and Table 2 define the **VP-8x8** *8x8 VGA / UXGA Matrix Switcher*. Figure 2 illustrates the underside of the **VP-8x8** unit, and Table 3 defines the underside features.

1 In increments of 0.5sec

2 The RGBHV signals are connected on HD15 pin connectors to reduce enclosure size

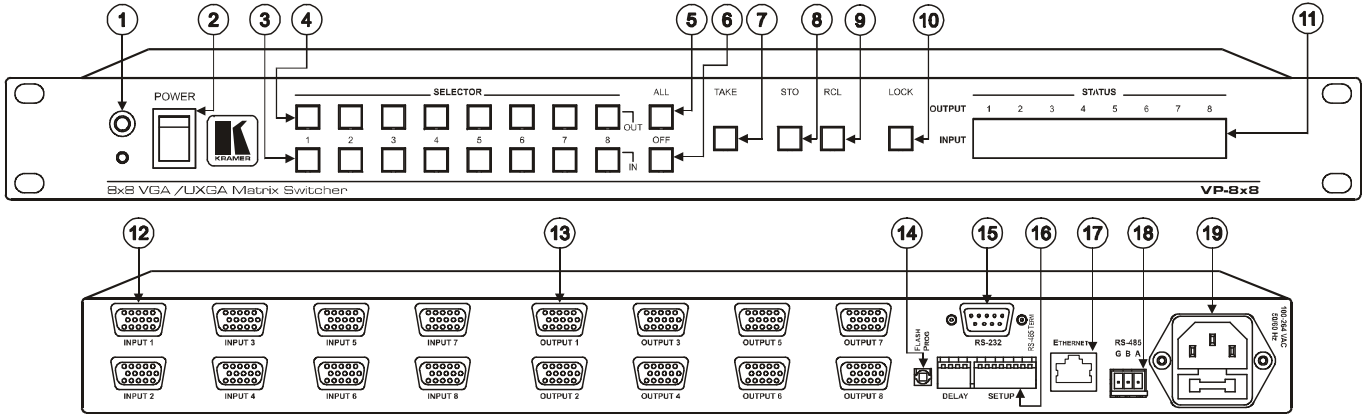


*Figure 1: VP-8x8 8x8 VGA / UXGA Matrix Switcher – Front and Rear View*

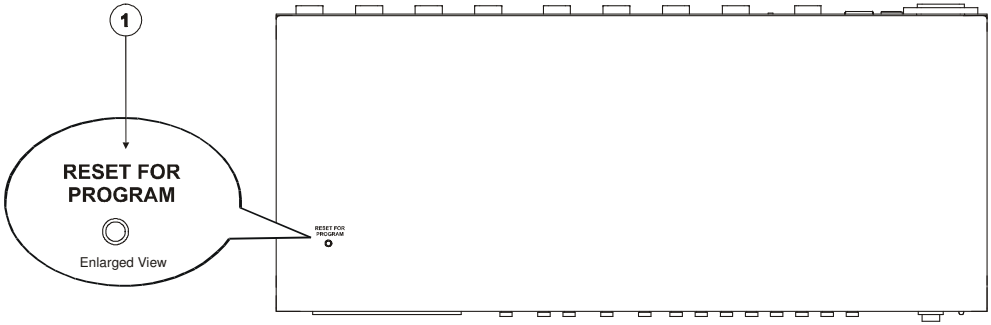


*Figure 2: VP-8x8 8x8 VGA / UXGA Matrix Switcher – Underside View*

*Table 1: Front Panel VP-8x8 8x8 VGA / UXGA Matrix Switcher Features*

| # | Feature | Function |
|---|---|---|
| 1 | IR Receiver | The red LED is illuminated when receiving signals from the Infra-red remote control transmitter |
| 2 | *POWER* Switch | Illuminated switch for turning the unit ON or OFF |
| 3 | *IN SELECTOR* Buttons | Select the input to switch to the output.<br>When a signal is detected, the input button illuminates in green |
| 4 | *OUT SELECTOR* Buttons | Select the output to which the input is switched |
| 5 | *ALL* Button | Pressing *ALL* followed by an *INPUT* button, connects that input to all outputs[1] |
| 6 | *OFF* Button | Press an *OUT* SELECTOR button and then an *OFF* button to disconnect that output from the inputs<br>Press the *ALL* button and then the *OFF* button to disconnect all the outputs |
| 7 | *TAKE* Button | Pressing *TAKE* toggles the mode between the Confirm mode[2] and the At Once mode (user confirmation per action is unnecessary) |
| 8 | *STO* (Store) Button | Pressing *STO* followed by an input/output button stores the current setting[3] |
| 9 | *RCL* (*Recall*) Button | Pressing the *RCL* button and the corresponding *IN*/*OUT* button recalls a setup from the non-volatile memory. The stored status blinks. Pressing a different *IN*/*OUT* button lets you view[4] another setup. After making your choice, pressing the *RCL* button again implements the new status |
| 10 | *LOCK* Button | Disengages the front panel switches |
| 11 | *STATUS 7-segment Display* | Displays the selected input switched to the output (marked above each input)[5] |

*Table 2: Rear Panel VP-8x8 8x8 VGA / UXGA Matrix Switcher Features*

| # | Feature | Function |
|---|---|---|
| 12 | HD15F *INPUT* Connectors | Connect to the video sources (from 1 to 8) |
| 13 | HD15F *OUTPUT* Connectors | Connect to the output acceptor (from 1 to 8) |
| 14 | *FLASH PROG* Button | Push in for "Program" to upgrade to the latest Kramer firmware (see section 7), or release for Normal (the factory default)[6] |
| 15 | *RS-232* DB 9F Port | Connects to the PC or the Remote Controller |
| 16 | *DELAY* and *SETUP* Dipswitches | Dipswitches for setup of the unit (*DELAY* dips 1, 2, 3 are for setting the delay time; *SETUP* dips 1, 2, 3, 4 are for setting machine #; 8 is for RS-485 Termination) |
| 17 | *ETHERNET* Connector | Connects to the PC or other Serial Controller through computer networking |
| 18 | *RS-485* Terminal Block Port | Pin G is for Ground connection; Pins B (-) and A (+) are for RS-485 |
| 19 | Power Connector with Fuse | AC connector enabling power supply to the unit |

*Table 3: VP-8x8 Underside Panel Features*

| # | Feature | Function |
|---|---|---|
| 1 | *RESET FOR PROGRAM* Button | Press to reset unit prior to firmware upgrade (see section 7.3) |

1 For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs

2 When in the Confirm mode, the TAKE button illuminates

3 For example, press STO and then the Output button # 3 to store in Setup # 3

4 Only view, nothing is implemented at this stage

5 Also displays the number of IN and OUT ports, the firmware version number, and the MACHINE #. Refer to section 6.1

6 The FLASH PROG "Reset" button is located on the underside of the unit

# 5 Connecting the VP-8x8

This section describes how to:

- Connect the **VP-8x8** rear panel (see section 5.1)
- Connect the **VP-8x8** to a controlling device via RS-232 (see section 5.2), RS-485 (see section 5.3) and/or the Ethernet (see sections 5.4 and 5.5)
- Set the dipswitches (see section 5.6)
- Connect several **VP-8x8** machines (see section 5.7)

## 5.1 Connecting the VP-8x8 Rear Panel

To connect the **VP-8x8**, do the following[1]:

1. Connect up to 8 VGA/UXGA computer graphics sources to the input connectors (see the illustration in Figure 3).
2. Connect[2] the 8 output connectors to up to 8 VGA/UXGA video acceptors[3].
3. Set the dipswitches (see section 5.4).
4. Connect a PC and/or controller (if required) to the RS-232 port (see section 5.2) and/or RS-485 port (see section 5.3).
5. Connect the power cord[4].

1 Switch OFF the power on each device before connecting it to your VP-8x8. After connecting your VP-8x8, switch on its power and then switch on the power on each device. DO NOT push in the rear panel Flash Program "Program" button (item 9 in Table 2) and DO NOT push in the underside Flash Program "Reset" button. These are only used for upgrading to the latest Kramer firmware (see section 7)

2 When less than eight outputs are required, connect only those outputs of the VP-8x8 that are required, and leave the other outputs unconnected

3 Displays or projectors

4 We recommend that you use only the power cord that is supplied with this machine

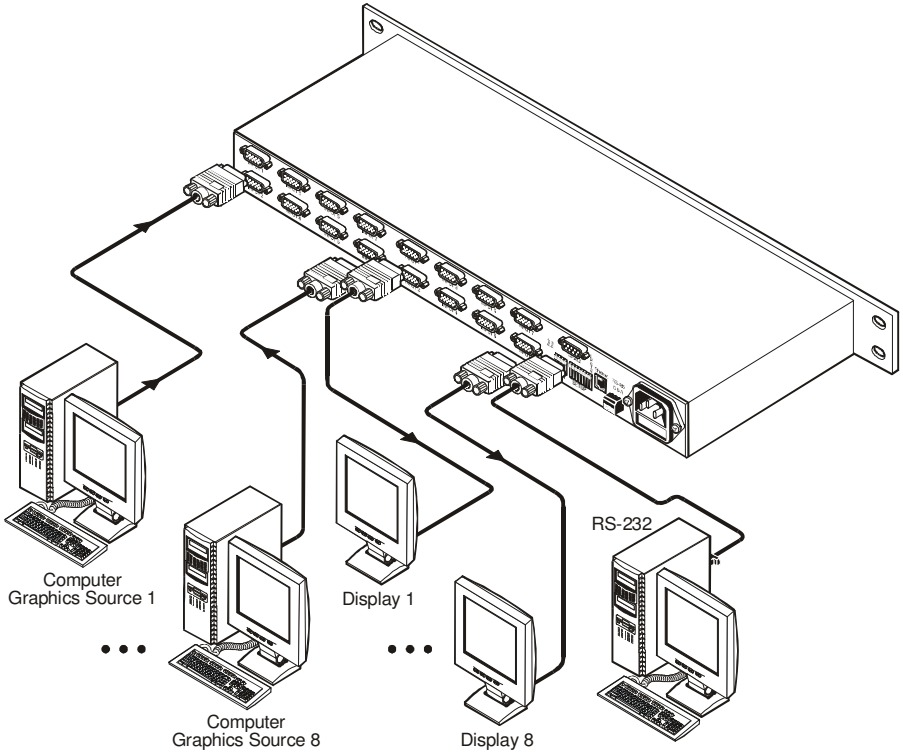


*Figure 3: Connecting the VP-8x8 8x8 VGA / UXGA Matrix Switcher*

## 5.2 Controlling via RS-232 (for example, using a PC)

To connect a PC to the **VP-8x8** unit, using the Null-modem adapter provided *with* the machine (recommended):

- Connect the RS-232 DB9 rear panel port on the Master **VP-8x8** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 port on your PC

To connect a PC to the **VP-8x8** unit, *without* using a Null-modem adapter:

- Connect the RS-232 DB9 port on your PC to the RS-232 DB9 rear panel port on the Master **VP-8x8** unit, as Figure 4 illustrates (depending on whether the PC has a 9-pin or 25-pin connector)

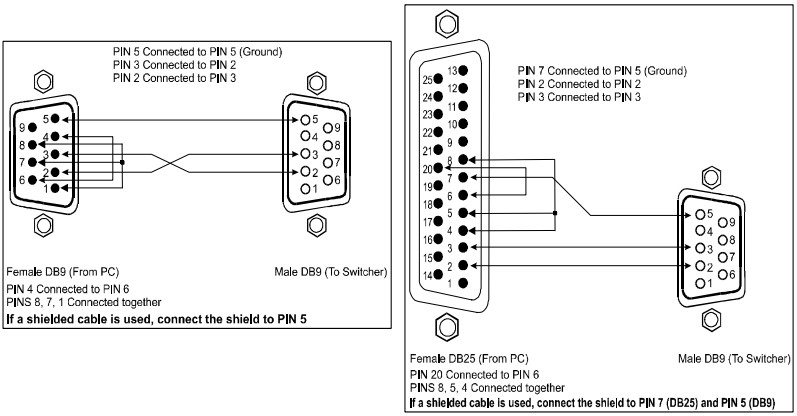
PIN 5 Connected to PIN 5 (Ground)
PIN 3 Connected to PIN 2
PIN 2 Connected to PIN 3
Female DB9 (From PC)
Male DB9 (To Switcher)
PIN 4 Connected to PIN 6
PINS 8, 7, 1 Connected together
If a shielded cable is used, connect the shield to PIN 5
PIN 7 Connected to PIN 5 (Ground)
PIN 2 Connected to PIN 2
PIN 3 Connected to PIN 3
Female DB25 (From PC)
Male DB9 (To Switcher)
PIN 20 Connected to PIN 6
PINS 8, 5, 4 Connected together
If a shielded cable is used, connect the shield to PIN 7 (DB25) and PIN 5 (DB9)

*Figure 4: Connecting a PC without using a Null-modem Adapter*

## 5.3 Controlling via RS-485

You can control a **VP-8x8** unit via an RS-485 controller, for example, a PC (equipped with an RS-485 interface) or a Master Programmable Remote Control system such as the Kramer **RC-3000**[1].

To connect an **RC-3000** to a **VP-8x8** unit (see Figure 5):

1. Connect the RS-485 terminal block port on the **RC-3000** to the RS-485 port on the **VP-8x8** unit, as follows:
   - Connect the "A" (+) PIN on the RS-485 rear panel port of the **RC-3000** to the "A" (+) PIN on the RS-485 rear panel port of the **VP-8x8** unit
   - Connect the "B" (-) PIN on the RS-485 rear panel port of the **RC-3000** to the "B" (-) PIN on the RS-485 rear panel port of the **VP-8x8** unit
   - If shielded twisted pair cable is used, the shield may be connected to the "G" (Ground) PIN on one of the units (for example, on the **RC-3000**)
2. Set the **VP-8x8** unit as Machine # 1, according to Table 10 (that is, DIP 1, DIP 2, DIP 3, and DIP 4 OFF), and set the other dipswitches on the **VP-8x8** unit, as follows:
   - Set DIP 5, DIP 6, and DIP 7 OFF
   - Set DIP 8 ON (for RS-485 Line Termination with 120Ω)

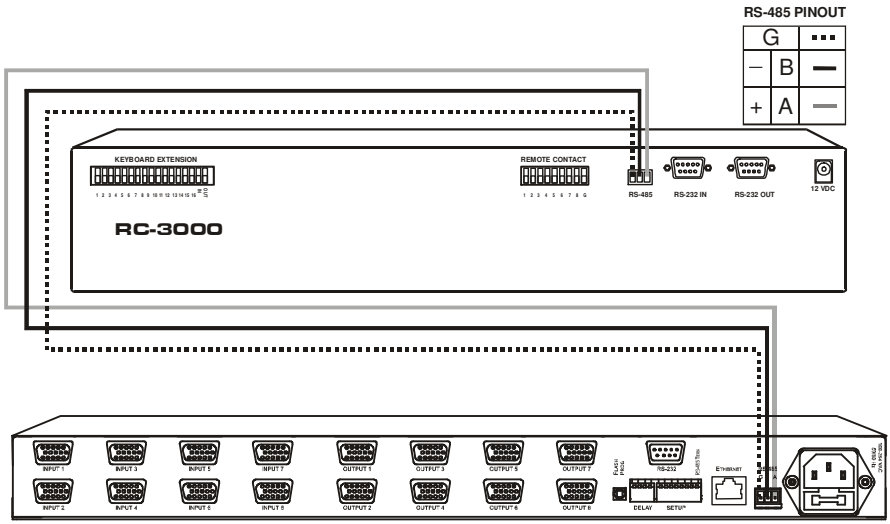


*Figure 5: Controlling via RS-485 (for example, using an RC-3000)*

1 Previously known as the VS-3000

## 5.4 Control Configuration via the Ethernet Port

To control several units via the Ethernet connect the Master unit (Machine # 1) via the Ethernet port to the LAN port of your PC. Using your PC, initially configure the settings as described in section 5.5.

## 5.5 Setting the Ethernet Port and Utilities

To control your **VP-8x8** via the Ethernet, perform an initial configuration as follows:

1. Connect the Ethernet port of the **VP-8x8** to the LAN port of your PC (see section 5.5.1).
2. Configure your Ethernet Port (see section 5.5.2).
3. Install the COM Port Redirector to control the **VP-8x8** (see section 5.5.5).

### 5.5.1 Connecting the VP-8x8 Ethernet port

You can connect the Ethernet port either via a crossover cable (see section 5.5.1.1) or a straight through cable (see section 5.5.1.2).

#### 5.5.1.1 Connecting via a Crossover Cable

Connect the Ethernet port of the **VP-8x8** to the LAN port on your PC, via a crossover cable with RJ-45 connectors, as Table 4 defines.

*Table 4: Crossover Cable RJ-45 PINOUT*

| Side 1 | |
|---|---|
| **PIN** | **Wire Color** |
| 1 | White-orange |
| 2 | Orange |
| 3 | White-green |
| 4 | Blue |
| 5 | White-blue |
| 6 | Green |
| 7 | White-brown |
| 8 | Brown |

| Side 2 | |
|---|---|
| **PIN** | **Wire Color** |
| 1 | White-green |
| 2 | Green |
| 3 | White-orange |
| 4 | Blue |
| 5 | White-blue |
| 6 | Orange |
| 7 | White-brown |
| 8 | Brown |

This type of connection is recommended for identification of the factory default IP Address of the **VP-8x8** during the initial configuration

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the My Network Places icon on your desktop.
2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 6).

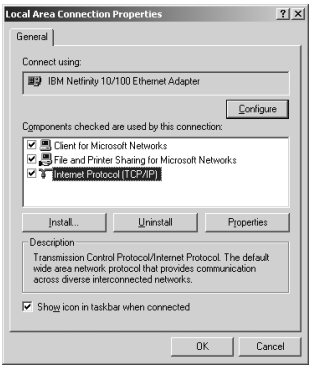


*Figure 6: Local Area Connection Properties Window*

6. Select Use the following IP Address, and fill in the details as shown in Figure 7.
7. Click **OK**.

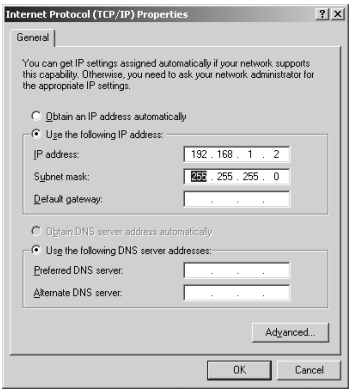
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 1 . 2
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

*Figure 7: Internet Protocol (TCP/IP) Properties Window*

#### 5.5.1.2 Connecting via a Straight-Through Cable

If connecting the Ethernet port of the **VP-8x8** to the LAN port on a network hub or network router, use a straight-through cable with RJ-45 connectors, as Table 5 defines:

*Table 5: Straight-through Cable RJ-45 PINOUT*

| Side 1 | |
|---|---|
| **PIN** | **Wire Color** |
| 1 | White-orange |
| 2 | Orange |
| 3 | White-green |
| 4 | Blue |
| 5 | White-blue |
| 6 | Green |
| 7 | White-brown |
| 8 | Brown |

| Side 2 | |
|---|---|
| **PIN** | **Wire Color** |
| 1 | White-orange |
| 2 | Orange |
| 3 | White-green |
| 4 | Blue |
| 5 | White-blue |
| 6 | Green |
| 7 | White-brown |
| 8 | Brown |

### 5.5.2 Installing and Running the XPort Configuration Software

To configure the Ethernet Port, you have to install and run the XPort configuration software.

It is important to consider the following points before logging into and configuring the Ethernet Port:

- The **VP-8x8** IP address must be configured before a network connection is available
- Only one person at a time may be logged into the network port. This eliminates the possibility of several people simultaneously attempting to configure the Device Server
- Network port logins can be disabled. The system manager will not be able to access the unit. This port can also be password protected

#### 5.5.2.1 Install XPort™ Installer

To install the XPort™ Installer, do the following:

1. Insert the product CD into your CD-ROM drive.
2. Run the XPort installer setup.
3. Respond to the installation wizard prompts.
4. Restart your system.

#### 5.5.2.2 Run XPort™ Installer

Click the **Start** button on the Task Bar and select **Programs\XPort Installer\XPort Installer**. The XPort™ Installer main dialog box displays (Figure 8).

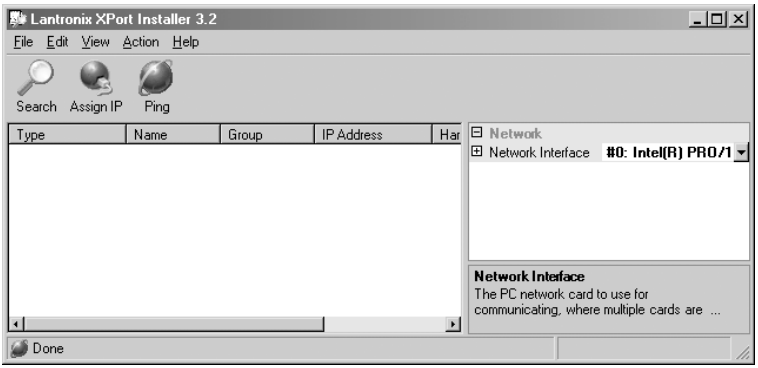


*Figure 8: XPort™ Installer Main Dialog Box*

To search for devices, click the **Search** icon or select **Search Network** from the Action menu.

#### 5.5.2.3 Assign IP Address

Figure 9 shows a device found on the network, with the IP addresses assigned at the factory. The Hardware Address is an individual permanent address assigned to a particular device on the network. The Hardware Address can be found on the product label inside the unit.

**Note:** Click on a device to view its attributes

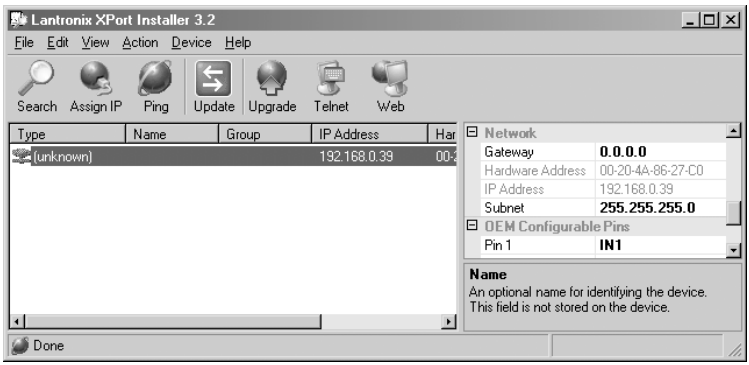


*Figure 9: Device Found on the Network*

To change the IP address, first select the device from the list, then click the **Assign IP** icon or select **Assign IP Address** from the Action menu. The hardware address and IP address are loaded into the Assign IP Address dialog box (Figure 10).

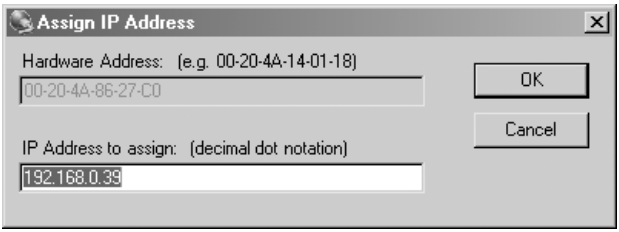


*Figure 10: IP Address Assignment Dialog Box*

Enter the new IP Address and click **OK**. The new IP Address will appear in the main window.

#### 5.5.2.4 Test the IP Address

To test the IP Address, do the following:

1. Select the device from the main window list.
2. Click the **Ping** icon or select **Ping** from the Action menu. The Ping Device dialog box shows the IP Address of the selected device.
3. Click the **Ping** button and the results will be displayed in the Status window. Use the **Clear Status** button to clear the window so you can ping the device again.
4. Click the **Close** button to close the dialog box and return to the main window.

**Note**: If you do not receive "Reply" messages, make sure the unit is properly attached to the network and that the IP address assigned is valid for the particular network segment you are working with. If you are not sure, check with your Systems Administrator

### 5.5.3 Configuring the Ethernet Port

You must configure the Ethernet Port so that it can communicate on a network with your serial device. For example, you must set the way the unit will respond to serial and network traffic, how it will handle serial packets, and when to start or close a connection. You can configure your unit locally or remotely using the following procedures:

- Use the XPort™ Installer to configure the unit. Some features are only available through the XPort™ Installer menus
- Use a standard Web browser to access the unit's internal Web pages and configure the unit over the network (see section 5.5.4)
  **This is the easiest and preferred method**
- Make sure that the Java™ 2 Runtime Environment (Standard Edition Version 1.4.1) software is installed on your PC. If not, download it from: http://java.sun.com

The unit's configuration is stored in non-volatile memory and is retained without power. You can change the configuration at any time. The unit performs a reset after the configuration has been changed and stored.

### 5.5.4 Using the Web Manager Page

To configure the Ethernet Port via a Web browser, first click one of the devices listed in the window, and then click the **Web** icon. The Web-Manager window now displays in your browser.

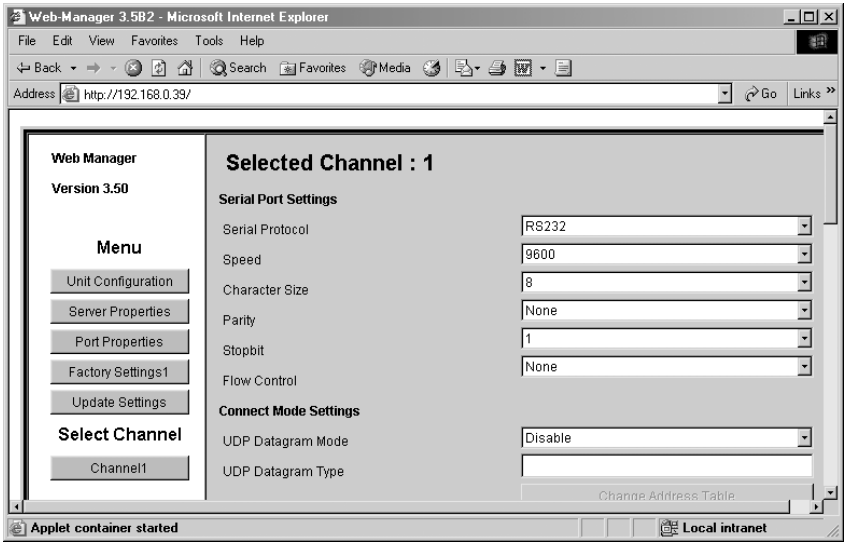


*Figure 11: Ethernet Port Web-Manager*

Table 6 describes the Web Manager window buttons.

*Table 6: Web Manager Window Buttons*

| Button | Function |
|---|---|
| Unit Configuration | Press to enter the Server Configuration and the Port Configuration settings (section 5.5.4.1) |
| Server Properties | Press to enter the Server Properties and change the server properties by editing any of the fields (section 5.5.4.2) |
| Port Properties | Press to enter the Port Properties and modify them |
| Factory Settings1 | Press to set to factory default settings |
| Update Settings | Press to update settings |
| Channel 1 | Disabled |

When in the Web Manager window:

1. Use the menu buttons to navigate to sub pages where you can configure server settings. See explanations of the configuration parameters in the following sections.
2. When you are finished, click the **Update Settings** button to save your settings.

### 5.5.4.1 Unit Configuration Button

Click the **Unit Configuration** button to display the following dialog box (Figure 12). This page contains the Server Configuration and the Port Configuration settings. These are static settings read from the device.

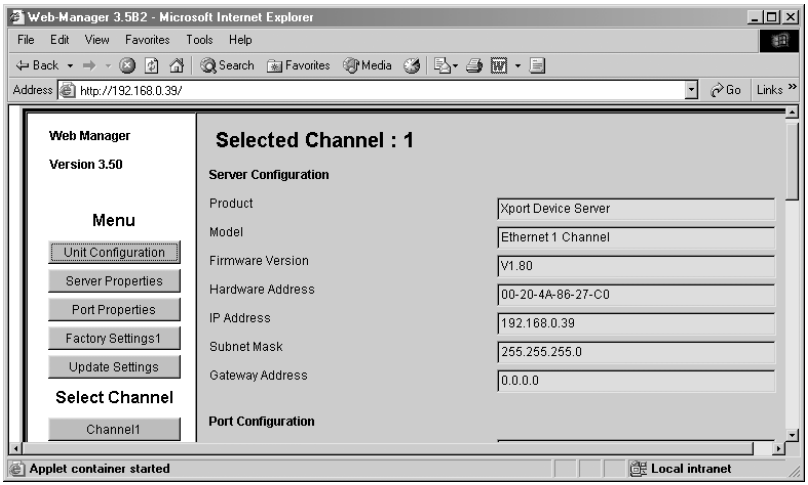


*Figure 12: Server Configuration in the Unit Configuration Window*

Figure 12 and Figure 13 show the information available in the Unit Configuration window.

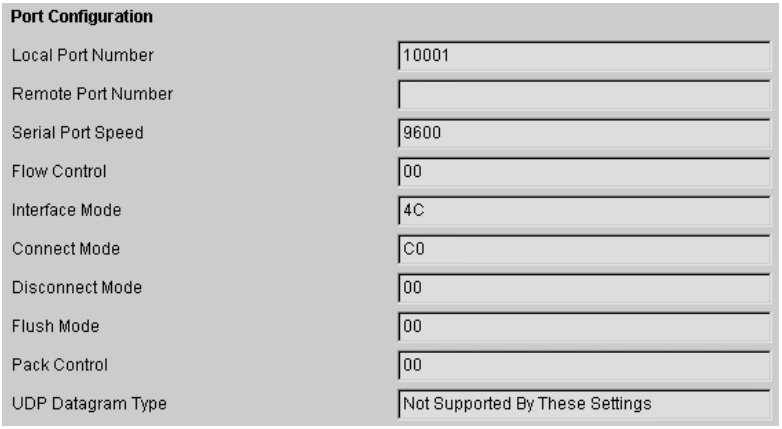


*Figure 13: Port Configuration in the Unit Configuration Window*

### 5.5.4.2 Server Properties Button

Click the **Server Properties** button to display the following dialog box (see Figure 14).

You can change the server properties by editing any of the fields. Hold the cursor over one of the fields to display Help messages.

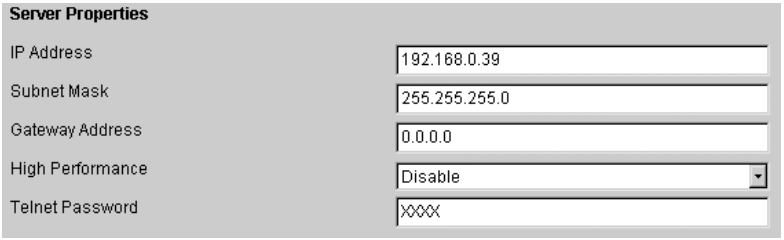


*Figure 14: Server Properties in the Unit Configuration Window*

- Changing the IP address will require you to enter the new IP address in the browser to reload the page
- In the Telnet Password field, enter a password to prevent unauthorized access to the Setup Mode via a Telnet connection to port 9999. The password is limited to 4 characters. (An enhanced password setting of 16 characters is available under Security Settings on the Telnet Setup Mode window)

### 5.5.4.3 Port Properties Button

Click the **Port Properties** button to display the following dialog boxes. Make sure that the Serial Port Settings window is set according to Figure 15[1].

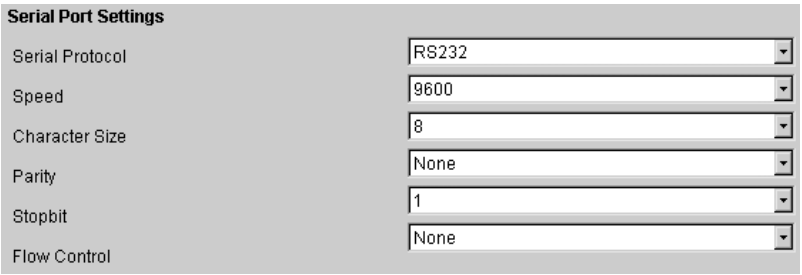


*Figure 15: Serial Port Settings Window*

Make sure that the Local Port in the Dedicated Connection window is set according to Figure 16.

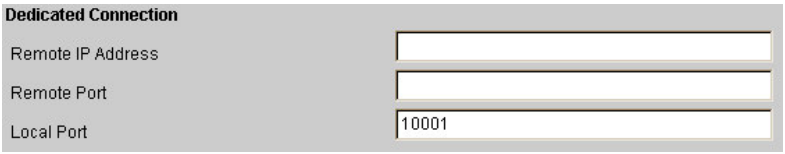


*Figure 16: Dedicated Connection Window*

Make sure that the Flush Mode Input buffer window is set according to Figure 17.

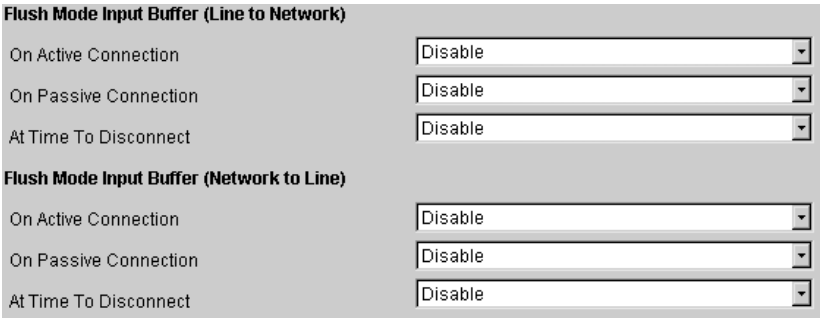


*Figure 17: Flush Mode Input Buffer Window*

1 You can change the server properties by selecting the desired properties from the drop down list

### 5.5.5 Controlling a Machine using the Com Port Redirector

The Com Port Redirector allows any PC running Windows to use ports on a network server as if they were connected directly to the PC. The Redirector creates a virtual COM port within Windows, which for most purposes acts just like the selected serial port on the server.

#### 5.5.5.1 Installing the Com Port Redirector

To install the Com Port Redirector, do the following:

1. Perform the appropriate step to start the installation:
   - If the Com Port Redirector is on a CD-ROM, insert the CD-ROM into the computer's CD-ROM drive
   - If you downloaded the Com Port Redirector, double-click the downloaded file

   Either step displays the Redirector - Welcome screen in Figure 18

*Figure 18: Com Port Redirector Welcome Screen*

2. Click the **Continue** button and follow the on-screen installation instructions.
3. After installation, the Setup Complete dialog box appears (Figure 19).

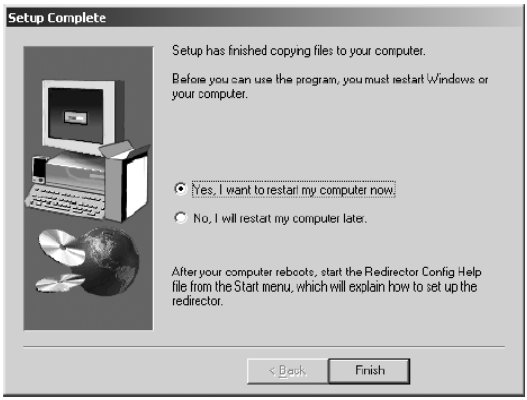
Setup Complete
Setup has finished copying files to your computer.
Before you can use the program, you must restart Windows or your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
After your computer reboots, start the Redirector Config Help file from the Start menu, which will explain how to set up the redirector.
< Back
Finish

*Figure 19: Setup Complete Dialog Box*

4. Click **Finish** to complete the installation and restart your computer.
5. Click the **Start** button in the Windows Taskbar, point to **Programs**, point to **Lantronix Redirector**, and click **Configuration**.
   The Com Port Redirector Configuration window appears (see Figure 20).

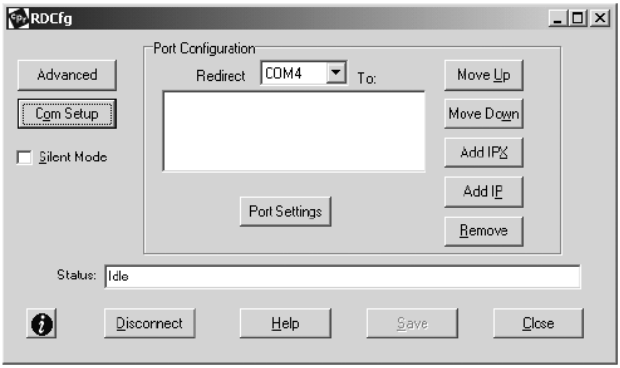


*Figure 20: Com Port Redirector Configuration Window*

6. Click the **Com Setup** button. A Port Setup dialog box appears (Figure 21), with the first logical communications port checked.
   The physical communication ports on the computer where the Com Port Redirector is installed are grayed-out and unavailable. In Figure 21, these are Com1 through Com3.
   Your unavailable communication ports may vary.

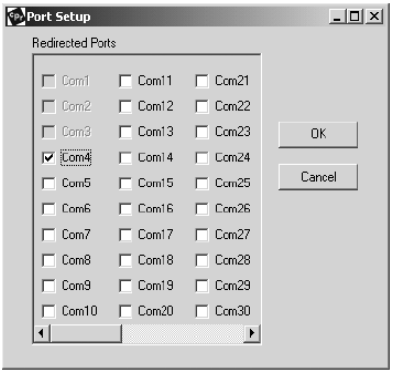


*Figure 21: Port Setup Window*

7. Click all the logical ports to which the PC will be redirected. A checkmark appears next to each logical port selected. Each port selected will be available from the **Redirect To** drop-down list in the Com Port Redirector Configuration window (see Figure 20).
8. To deselect a port, click it again to remove the checkmark next to it. Removing the checkmark indicates that the port will not be available from the **Redirect To** drop-down list.
9. When finished, click **OK**.

**Note**: After you use the Port Setup dialog box to add or remove Com ports, restart your computer

#### 5.5.5.2 Configuring the Com Port Redirector

Com Port Redirector is a software utility for network-enabling legacy software applications that do not have network support. Com Port Redirector installs virtual Windows® communication ports. These virtual communication ports are redirected over a network to the serial port of the **VP-8x8**.

**Configuration Guidelines**

Observe the following general guidelines when preparing the **VP-8x8** for use with the Com Port Redirector:

- The machine to which the Com Port Redirector will connect must have an IP address
- The PC running the Com Port Redirector must have a good network connection to the **VP-8x8**

- If redirecting over a Wide Area Network (WAN), both the PC and the **VP-8x8** must have a correct gateway address configured in their TCP/IP[1] settings

### Redirector Configuration

Before using the Com Port Redirector, you have to configure the **VP-8x8** Ethernet Port. To do so, do the following:

- Assign a compatible IP address to the device server
- Set the serial settings (baud rate, parity, flow control, data bits)
- Set the port number to **10001** (recommended)

For specific instructions, see section 5.5.1.

To configure the Com Port Director:

1. Click the **Start** button in the Windows Taskbar, point to **Programs**, point to **Lantronix Redirector**, and click **Configuration**. The Com Port Redirector Configuration window appears (see Figure 20).
2. Using the **Redirect To** drop-down list at the top of the Com Port Redirector Configuration window, click a redirected Com port.
3. Click the **Add IP** button. The IP Service Setup dialog box appears (see Figure 22).

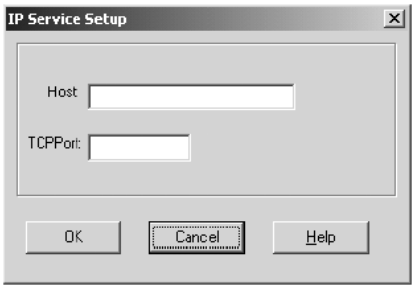


*Figure 22: IP Service Setup Dialog Box*

4. In the **Host** field, enter the IP address of the **VP-8x8**.
5. In the **TCPPort** field, type **10001** for Channel 1 (according to the local port, configured in the **VP-8x8** unit).
6. Click **OK**.

1 TCP/IP is Transmission Control Protocol/Internet Protocol

7. Click the **Port Settings** button. The Port Settings dialog box appears. Figure 23 shows the Port Settings dialog box and Table 7 describes its settings.
8. Check **Raw Mode**.

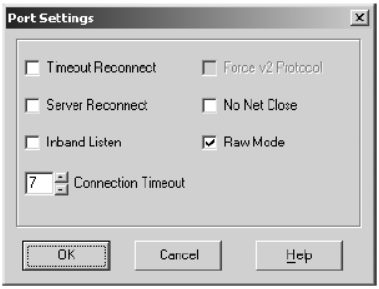


*Figure 23: Port Settings Window*

9. Click **OK**.
10. Click the **Save** button (see Figure 20).
11. Click the **Close** button (see Figure 20).

*Table 7: Port Settings Description*

| Setting | Description |
|---|---|
| Timeout Reconnect | If checked, the Com Port Redirector re-establishes the connection if the connection times out[1] |
| Server Reconnect | If checked, the Com Port Redirector re-establishes the connection if the server closes it[1] |
| Inband Listen | If checked, the Com Port Redirector uses the inband redirector protocol on inbound connections from a **VP-8x8**. This protocol allows settings like modem signals, baud rate and parity to be exchanged between Com Port Redirector and the server |
| Connection Timeout | Specifies the maximum number of seconds that the Com Port Redirector waits for a connection to be made before giving up on this attempt. If Timeout Reconnect is enabled, each connection attempt lasts this long. If Timeout Reconnect is disabled, the connection attempt fails after this interval and no more attempts are made |
| Force v2 Protocol | N/A |
| No Net Close | If checked, prevents the network connection from being dropped when the communications application is closed. To drop the connection, click the Disconnect button in the Com Port Redirector Configuration window. This allows applications to close and reopen ports, without waiting for the network connection to be reestablished and negotiated |
| Raw Mode | If checked, Raw Mode forms a raw TCP connection to the server's serial port, accelerating the connection between the communications application and the server, without sending configuration or status information from the PC to the server. When using Raw Mode, configure the Com Port Redirector and your **VP-8x8** to use the same port number |

1 When auto-reconnecting, the Com Port Redirector tries to reconnect until the connection succeeds or you click the Cancel button in the pop-up connection dialog box. If the port was closed by the communications application or by clicking Disconnect, the Com Port Redirector does not try to auto-reconnect

### Verify Connectivity

After configuring the Com Port Redirector and the **VP-8x8**, use a terminal emulation program such as HyperTerminal to verify connectivity from the Com Port Redirector to the **VP-8x8**. To verify connectivity between the Com Port Redirector and the **VP-8x8** using HyperTerminal:

1. Click the **Start** button in the Windows Taskbar, point to **Programs**, point to Accessories, point to Communications, and click HyperTerminal.
2. Open a new session to the virtual Com port configured to connect to the device server.
3. When the HyperTerminal window opens, a pop-up window displays: *Attempting to connect to service*.
   If this message is replaced by: *Successfully redirected to service*, the connection from the Com Port Redirector to the device server was successful.
   However, if the message is replaced by *Failed to connect to any service*, the connection failed. Ensure your settings are correct.
4. To hide the pop-up window, check **Silent Mode** on the Com Port Redirector Configuration window (Figure 24).

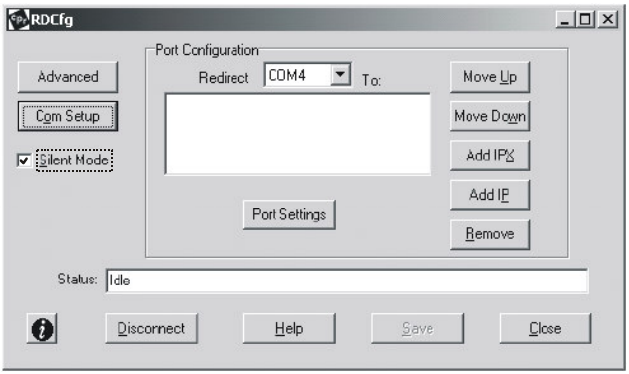


*Figure 24: Silent Mode Checked in the RDCfg Window*

### 5.5.6 Using the Com Port Redirector

Observe the following general guidelines when using the Com Port Redirector:

- Do not run the Com Port Redirector with other software that installs a virtual com port
- Do not run the Com Port Redirector with other Com Port Redirection software on the same PC

## 5.6 Setting the Dipswitches

By default, all dipswitches are set to OFF. Figure 25 illustrates the **VP-8x8** dipswitches:

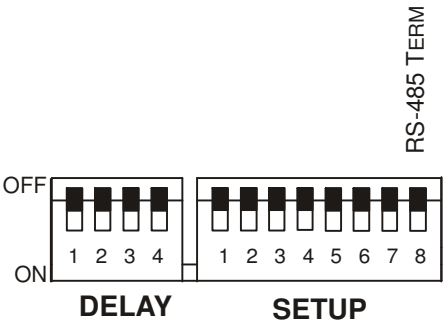


*Figure 25: VP-8x8 Dipswitches*

*Table 8: Dipswitch Settings*

| DIPS | Function | Description |
|---|---|---|
| 1, 2, 3 | DELAY | Determines switching delay time |
| 4 | Reserved | Set to OFF |
| 1, 2, 3, 4 | Machine # | Determines the number of the machine in the sequence |
| 5, 6, 7 | Reserved | Set to OFF |
| 8 | RS-485 TERM | ON for RS-485 Line Termination with 120Ω;<br>OFF for no RS-485 Line Termination |

### 5.6.1 Setting the Delay

You can achieve clean transitions when switching between non-genlocked sources by setting the delay time—ranging from 0sec to 3.5sec[1]—via the DELAY dipswitches, as Table 9 defines. The **VP-8x8** unit is shipped (its factory default state) with no delay, that is, the DELAY dipswitches are set up for a 0sec delay.

*Table 9: DELAY Dipswitch Settings*

| sec | DIP 1 | DIP 2 | DIP 3 |
|---|---|---|---|
| 0 | OFF | OFF | OFF |
| 0.5 | OFF | OFF | ON |
| 1.0 | OFF | ON | OFF |
| 1.5 | OFF | ON | ON |
| 2.0 | ON | OFF | OFF |
| 2.5 | ON | OFF | ON |
| 3.0 | ON | ON | OFF |
| 3.5 | ON | ON | ON |

1 In increments of 0.5sec

### 5.6.2 Setting the Machine # Dipswitches

The Machine # determines the position of a **VP-8x8** unit, specifying which **VP-8x8** unit is being controlled when several **VP-8x8** units connect to a PC or serial controller. Set the Machine # on a **VP-8x8** unit via Setup DIPS 1, 2, 3 and 4, according to Table 10.

When using a standalone **VP-8x8** unit, set the Machine # to 1. When connecting more than one **VP-8x8** unit, set the first machine (the Master) that is closest to the PC, as Machine # 1 (dipswitches are set to OFF).

*Table 10: Machine # Dipswitch Settings*

| Mach. # | DIP 1 | DIP 2 | DIP 3 | DIP 4 |
|---|---|---|---|---|
| 1 | OFF | OFF | OFF | OFF |
| 2 | OFF | OFF | OFF | ON |
| 3 | OFF | OFF | ON | OFF |
| 4 | OFF | OFF | ON | ON |
| 5 | OFF | ON | OFF | OFF |
| 6 | OFF | ON | OFF | ON |
| 7 | OFF | ON | ON | OFF |
| 8 | OFF | ON | ON | ON |

| Mach. # | DIP 1 | DIP 2 | DIP 3 | DIP 4 |
|---|---|---|---|---|
| 9 | ON | OFF | OFF | OFF |
| 10 | ON | OFF | OFF | ON |
| 11 | ON | OFF | ON | OFF |
| 12 | ON | OFF | ON | ON |
| 13 | ON | ON | OFF | OFF |
| 14 | ON | ON | OFF | ON |
| 15 | ON | ON | ON | OFF |
| 16 | ON | ON | ON | ON |

## 5.7 Cascading Machines

You can cascade up to 16 **VP-8x8** units with control from a PC or serial controller (see Figure 26).

To cascade up to 16 individual **VP-8x8** units via RS-485, do the following:

1. Connect the VGA/UXGA sources and acceptors, as section 5.1 describes.
2. Connect the RS-232 port[1] onto the first **VP-8x8** unit to the PC using the Null-modem adapter provided with the machine (recommended), as section 5.2 describes.
3. Connect the RS-485 terminal block port on the first unit to the RS-485 port on the second **VP-8x8** unit and so on, connecting all the RS-485 ports.
4. Set the dipswitches, as section 5.4 describes:
   - Set the first **VP-8x8** unit as Machine # 1 and the following 15 **VP-8x8** units as Machine # 2 to Machine # 16, according to Table 10
   - Set DIP 8 ON on the first and last **VP-8x8** units (terminating the RS-485 line at 120Ω). Set DIP 8 OFF on the other **VP-8x8** units
   - Set DIP 5, DIP 6 and DIP 7 OFF on all **VP-8×8** units

1 Alternatively, the RS-485 port could be used for PC control (instead of RS-232)

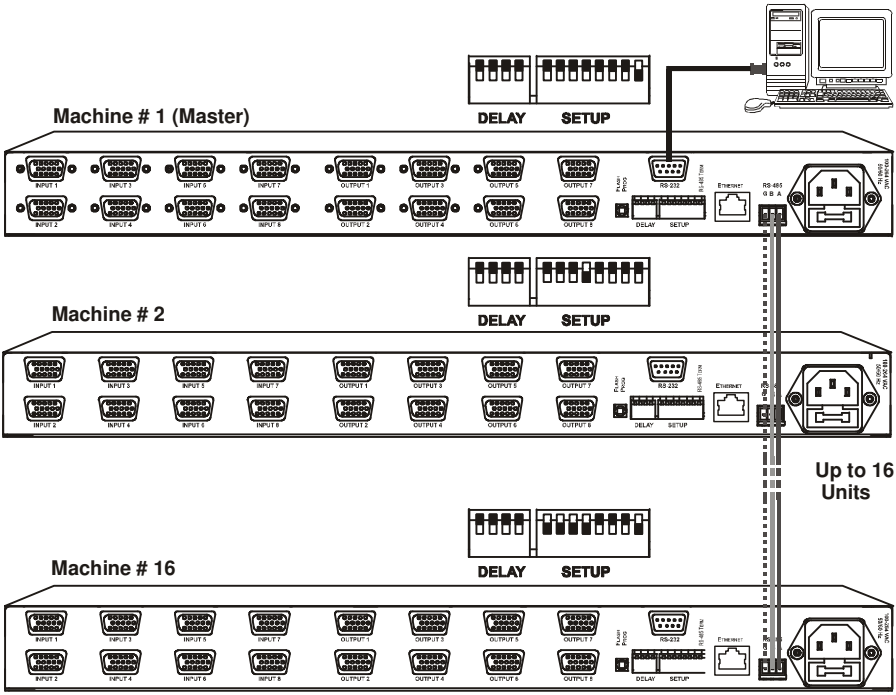


*Figure 26: Control Configuration via RS-232 and RS-485*

# 6 Operating the VP-8x8

You can operate your **VP-8x8** via:

- The front panel buttons
- RS-232/RS-485 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer **RC-IR1** Infra-Red Remote Control Transmitter
- The Ethernet

## 6.1 Displaying Unit Characteristics

The **VP-8x8** unit characteristics are displayed in the following circumstances:

- Immediately (and automatically) after switching on the power; and
- When simultaneously pressing, for 3 seconds, the 3 "IN" buttons 1, 2 and 3

The following information is displayed in the 7-segment Display[1]:

- The number of IN and OUT ports (shown during the "First Display[2]")
- The firmware version number and the Machine # (shown during the "Second Display[2]")

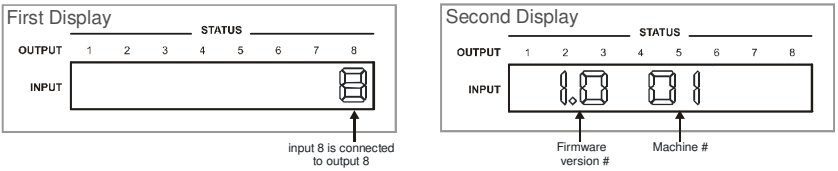


*Figure 27: VP-8x8 Unit Characteristics*

## 6.2 Confirming Settings

You can choose to work in the At Once or the Confirm mode.

In the At Once mode (TAKE button is dim):

- Pressing an OUT-IN combination implements the switch immediately
- You save time as execution is immediate and actions require no user confirmation
- No protection is offered against changing an action in error

In the Confirm mode (TAKE button is lit):

- You can key-in several actions and then confirm them by pressing the TAKE button, to simultaneously activate the multiple switches
- Every action requires user confirmation, protecting against erroneous switching
- Execution is delayed[3] until the user confirms the action

1 Item 7 in Table 1

2 The "First Display" appears initially, followed a few seconds later by the "Second Display"

3 Failure to press the TAKE button within one minute (the Timeout) will abort the action

### 6.2.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes, do the following:

1. Press the dim TAKE button to toggle from the At Once mode (in which the TAKE button is dim) to the Confirm mode (in which the TAKE button illuminates).
   Actions now require user confirmation and the TAKE button illuminates.
2. Press the illuminated TAKE button to toggle from the Confirm mode back to the At Once mode.
   Actions no longer require user confirmation and the TAKE button no longer illuminates.

### 6.2.2 Confirming a Switching Action

To confirm a switching action (in the Confirm mode), do the following:

1. Press an OUT-IN combination.
   The corresponding 7-segment Display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm the action.
   The corresponding 7-segment Display no longer blinks. The TAKE button illuminates.

To confirm several actions (in the Confirm mode), do the following:

1. Press each OUT-IN combination in sequence.
   The corresponding 7-segment Display blinks. The TAKE button also blinks.
2. Press the blinking TAKE button to confirm all the actions.
   The corresponding 7-segment Display no longer blinks. The TAKE button illuminates.

## 6.3 Storing/Recalling Input/Output Configurations

You can store and recall up to 16 input/output configurations using the 8 input buttons and the 8 output buttons, as Figure 28 illustrates:

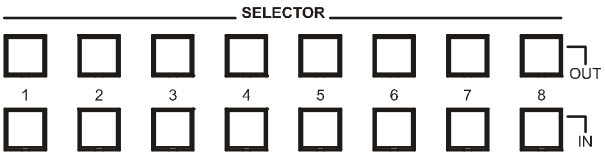


*Figure 28: Storing and Recalling using the Input/Output Buttons*

### 6.3.1 Storing an Input/Output Configuration

To store the current status in memory, do the following:

1. Press the STO button.
   The STO button blinks.
2. Press one of the 16 INPUT/OUTPUT buttons (this will be the setup # in which the current status is stored). If in the Confirm mode, press the blinking TAKE button to confirm the action.
   The memory stores the data at that reference.

### 6.3.2 Recalling an Input/Output Configuration

To recall an input/output configuration, do the following:

1. Press the RCL button.
   The RCL button blinks.
2. Press the appropriate INPUT/OUTPUT button (the button # corresponding to the setup #). If in the Confirm mode, that setup configuration will blink in the 7-segment Display, together with the RCL button and the TAKE button, and will only be implemented after pressing the TAKE button.
   The memory recalls the stored data from that reference.

Tip: If you cannot remember which of the 16 input/output configurations is the one that you want, set the **VP-8x8** to the Confirm mode and manually scan all the input/output configurations until you locate it.

### 6.3.3 Deleting an Input/Output Configuration

To delete an input/output configuration, do the following:

1. Press the STO and RCL buttons simultaneously.
   Both the STO and RCL buttons blink.
2. Press the appropriate INPUT/OUTPUT button.
   This erases that specific input/output configuration from the memory, leaving it empty and available[1].

1 Storing a new configuration over a previous configuration (without deleting it first) replaces the previous configuration

## 6.4 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[1] your **VP-8x8**. Unlocking releases the protection mechanism.

To lock the **VP-8x8**:

- Press the LOCK button for more than two seconds, until the LOCK button is illuminated
  The front panel is locked. Pressing a button will have no effect other than causing the LOCK button to blink[2]

To unlock the **VP-8x8**:

- Press the illuminated LOCK button for more than two seconds, until the LOCK button is no longer illuminated
  The front panel unlocks

1 Nevertheless, even though the front panel is locked you can still operate via RS-232 or RS-485, as well as via the Kramer RC-IR1 Infra-Red Remote Control Transmitter

2 Warning that you need to unlock to regain control via the front panel

# 7 Flash Memory Upgrade

The **VP-8x8** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 7.1)
- Connecting the PC to the RS-232 port (see section 7.2)
- Upgrading Firmware (see section 7.3)

## 7.1 Downloading from the Internet

You can download the up-to-date file from the Internet. To do so:

1. Go to our Web site at and download the file: "FLIP_VP8x8.zip" from the Technical Support section.
2. Extract the file: "*FLIP_VP8x8.zip*" to a folder (for example, C:\Program Files\Kramer Flash).
3. Create a shortcut on your desktop to the file: "*FLIP.EXE*".

## 7.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **VP-8x8** unit, do the following:

1. Connect the RS-232 DB9 rear panel port on the **VP-8x8** unit to the Null-modem adapter and connect the Null-modem adapter with a 9-wire flat cable to the RS-232 DB9 COM port on your PC (see section 5.2).
2. On the rear panel, push in the FLASH PROG button (to program), using a screwdriver.
3. Connect the power on the **VP-8x8** unit and switch it ON.
4. On the underside panel, push in the RESET FOR PROGRAM button (see Figure 2), using a screwdriver.

## 7.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the desktop icon: "*Shortcut to FLIP.EXE*".
   The Splash screen appears as follows:

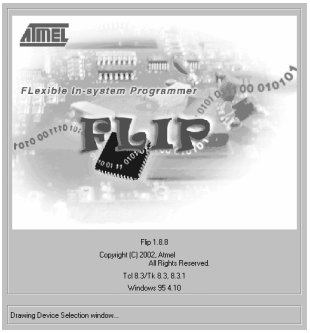


*Figure 29: Splash Screen*

2. After a few seconds, the Splash screen is replaced by the "*Atmel – Flip*" window:

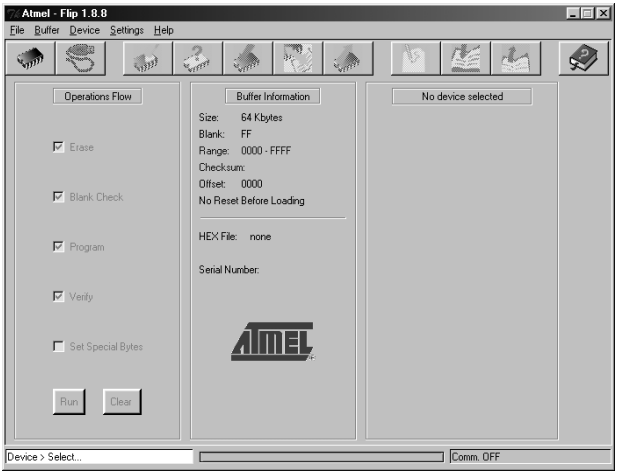


*Figure 30: Atmel – Flip Window*

3. Press the keyboard shortcut key *F2* (or select the "*Select*" command from the *Device* menu, or press the integrated circuit icon in the upper right corner of the window).
   The "*Device Selection*" window appears:

*Figure 31: Device Selection Window*

4. Click the button next to the name of the device and select from the list: AT89C51RD2:

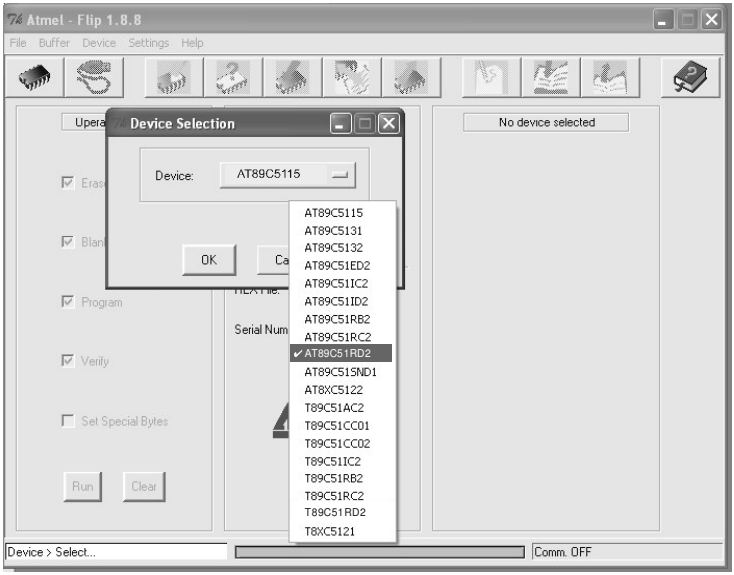


*Figure 32: Selecting the Device from the Selection Window*

5. Click OK and select "*Load Hex*" from the *File* menu.

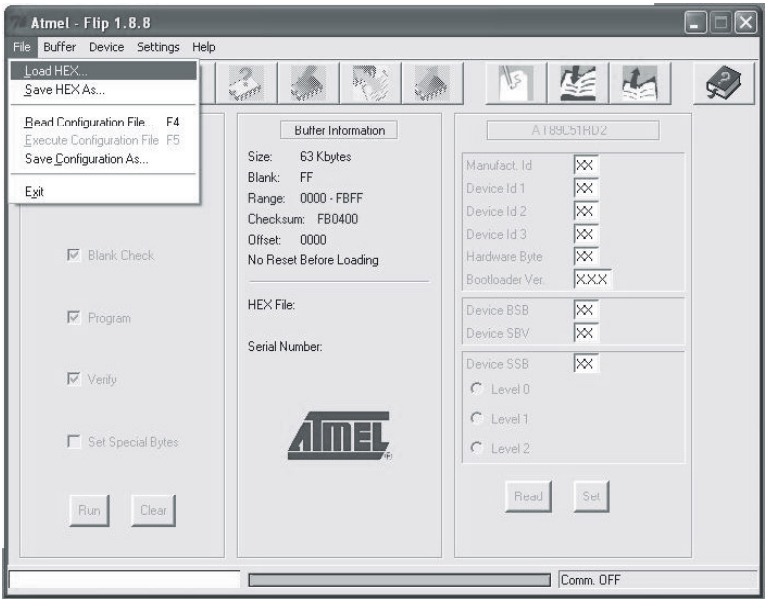


*Figure 33: Loading the Hex*

6. The Open File window opens. Select the correct HEX file that contains the updated version of the firmware for **VP-8x8** (for example ***8x8M_V1p2.hex***) and click Open.

7. Press the keyboard shortcut key *F3* (or select the "*Communication / RS232*" command from the *Settings* menu, or press the keys: *Alt SCR*). The "*RS232*" window appears. Change the COM port according to the configuration of your computer and select the 9600 baud rate:

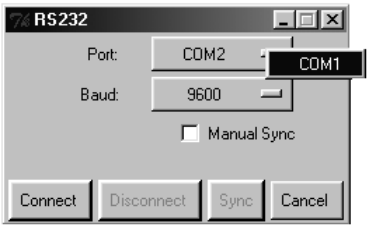


*Figure 34: RS-232 Window*

8. Click Connect.
   In the "*Atmel – Flip*" window, in the *Operations Flow* column, the *Run* button is active, and the name of the chip appears as the name of the third column: *AT89C51RD2*.

Verify that in the *Buffer Information* column, the "*HEX File: VP8x8.hex*" appears.

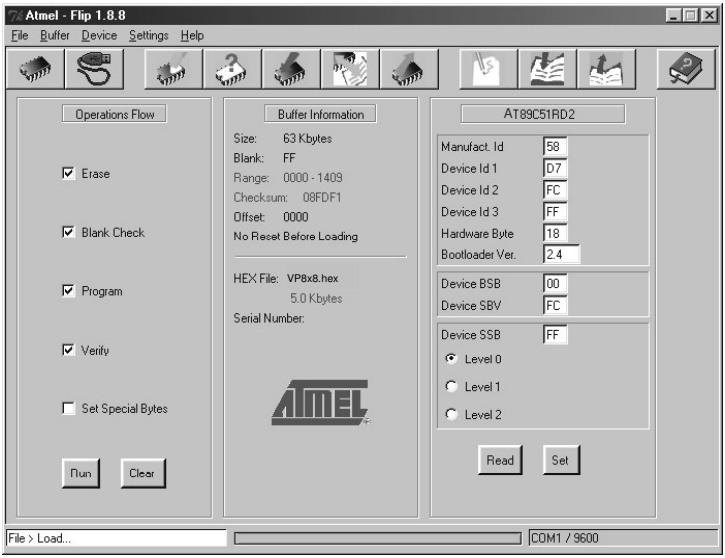


*Figure 35: Atmel – Flip Window (Connected)*

9. Click *Run*.
   After each stage of the operation is completed, the check-box for that stage becomes colored green[1].
   When the operation is completed, all 4 check-boxes will be colored green and the status bar message: *Memory Verify Pass* appears[2]:

1 See also the blue progress indicator on the status bar

2 If an error message: "Not Finished" shows, click Run again

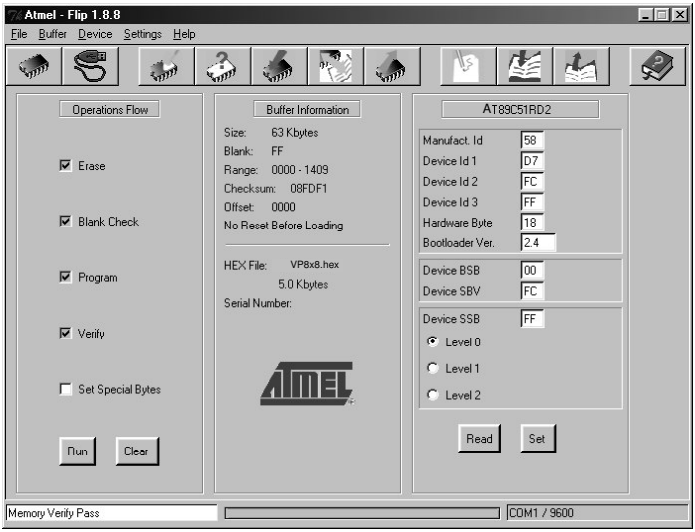


*Figure 36: Atmel – Flip Window (Operation Completed)*

10. Close the "*Atmel – Flip*" window.
11. Disconnect the power on the **VP-8x8**.
12. Disconnect the *RS-232* rear panel port on the **VP-8x8** unit from the Null-modem adapter.
13. Release FLASH PROG button on rear panel (Figure 1).
14. Connect the power to the **VP-8x8**.
    Upon initialization, the new **VP-8x8** software version shows in the INPUT STATUS 7-segment Display (Figure 27).

# 8 Technical Specifications

Table 11 includes the technical specifications:

*Table 11: Technical Specifications[1] of the VP-8x8 8x8 Video Audio Matrix Switcher*

| | |
|---|---|
| INPUTS: | 8 VGA on HD15 connectors (VGA through UXGA) |
| OUTPUTS: | 8 VGA on HD15 connectors (VGA through UXGA) |
| MAX. OUTPUT LEVEL: | 1.5Vpp |
| BANDWIDTH (-3dB): | 400MHz |
| DIFF. GAIN: | 0.04% |
| DIFF. PHASE: | 0.04 Deg. |
| K-FACTOR: | <0.05% |
| S/N RATIO: | 75dB |
| CROSSTALK (all hostile): | –53dB |
| CONTROLS: | 22 front panel buttons, RS-232, RS-485, Ethernet |
| COUPLING: | DC |
| POWER SOURCE: | 100-264 VAC, 50/60 Hz; 23VA |
| DIMENSIONS: | 19-inch (W), 7-inch (D) 1U (H) rack-mountable |
| WEIGHT: | 2.7 kg (6 lbs.) approx. |
| ACCESSORIES: | Power cord, Null modem adapter, Windows®-based Kramer control software, Infra-red remote control transmitter |

1 Specifications are subject to change without notice

# 9 Table of Hex Codes for Serial Communication

Table 12 lists the Hex values for a single machine (*MACHINE #* 1):

*Table 12: VP-8x8 Hex Codes for Switching via RS-232/RS-485*

| | Switching Video Channels | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **OUT 1** | **OUT 2** | **OUT 3** | **OUT 4** | **OUT 5** | **OUT 6** | **OUT 7** | **OUT 8** |
| **IN 1** | 01<br>81<br>81<br>81 | 01<br>81<br>82<br>81 | 01<br>81<br>83<br>81 | 01<br>81<br>84<br>81 | 01<br>81<br>85<br>81 | 01<br>81<br>86<br>81 | 01<br>81<br>87<br>81 | 01<br>81<br>88<br>81 |
| **IN 2** | 01<br>82<br>81<br>81 | 01<br>82<br>82<br>81 | 01<br>82<br>83<br>81 | 01<br>82<br>84<br>81 | 01<br>82<br>85<br>81 | 01<br>82<br>86<br>81 | 01<br>82<br>87<br>81 | 01<br>82<br>88<br>81 |
| **IN 3** | 01<br>83<br>81<br>81 | 01<br>83<br>82<br>81 | 01<br>83<br>83<br>81 | 01<br>83<br>84<br>81 | 01<br>83<br>85<br>81 | 01<br>83<br>86<br>81 | 01<br>83<br>87<br>81 | 01<br>83<br>88<br>81 |
| **IN 4** | 01<br>84<br>81<br>81 | 01<br>84<br>82<br>81 | 01<br>84<br>83<br>81 | 01<br>84<br>84<br>81 | 01<br>84<br>85<br>81 | 01<br>84<br>86<br>81 | 01<br>84<br>87<br>81 | 01<br>84<br>88<br>81 |
| **IN 5** | 01<br>85<br>81<br>81 | 01<br>85<br>82<br>81 | 01<br>85<br>83<br>81 | 01<br>85<br>84<br>81 | 01<br>85<br>85<br>81 | 01<br>85<br>86<br>81 | 01<br>85<br>87<br>81 | 01<br>85<br>88<br>81 |
| **IN 6** | 01<br>86<br>81<br>81 | 01<br>86<br>82<br>81 | 01<br>86<br>83<br>81 | 01<br>86<br>84<br>81 | 01<br>86<br>81<br>81 | 01<br>86<br>82<br>81 | 01<br>86<br>83<br>81 | 01<br>86<br>84<br>81 |
| **IN 7** | 01<br>87<br>81<br>81 | 01<br>87<br>82<br>81 | 01<br>87<br>83<br>81 | 01<br>87<br>84<br>81 | 01<br>87<br>85<br>81 | 01<br>87<br>86<br>81 | 01<br>87<br>87<br>81 | 01<br>87<br>88<br>81 |
| **IN 8** | 01<br>88<br>81<br>81 | 01<br>88<br>82<br>81 | 01<br>88<br>83<br>81 | 01<br>88<br>84<br>81 | 01<br>88<br>85<br>81 | 01<br>88<br>86<br>81 | 01<br>88<br>87<br>81 | 01<br>88<br>88<br>81 |

# 10 Kramer Protocol 2000[1]

The **VP-8x8** is compatible with Kramer's Protocol 2000 (version 0.46) (below). This RS-232/RS-485 communication protocol uses four bytes of information as defined below. For RS-232, a null-modem connection between the machine and controller is used. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

*Table 13: Protocol Definitions*

| MSB | | | | | | | LSB |
|---|---|---|---|---|---|---|---|
| | **DESTI-NATION** | **INSTRUCTION** | | | | | |
| 0 | D | N5 | N4 | N3 | N2 | N1 | N0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 1st byte | | | | | | | |
| | **INPUT** | | | | | | |
| 1 | I6 | I5 | I4 | I3 | I2 | I1 | I0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 2nd byte | | | | | | | |
| | **OUTPUT** | | | | | | |
| 1 | O6 | O5 | O4 | O3 | O2 | O1 | O0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 3rd byte | | | | | | | |
| | | | **MACHINE NUMBER** | | | | |
| 1 | OVR | X | M4 | M3 | M2 | M1 | M0 |
| 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 4th byte | | | | | | | |

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.
Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.

1 You can download our user-friendly "Software for Calculating Hex Codes for Protocol 2000" from the technical support section on our Web site at: http://www.kramerelectronics.com

For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

*Table 14: Instruction Codes for Protocol 2000*

Note: All values in the table are decimal, unless otherwise stated.

| INSTRUCTION | | DEFINITION FOR SPECIFIC INSTRUCTION | | NOTE |
|---|---|---|---|---|
| # | DESCRIPTION | INPUT | OUTPUT | |
| 0 | RESET VIDEO | 0 | 0 | 1 |
| 1 | SWITCH VIDEO | Set equal to video input which is to be switched<br>(0 = disconnect) | Set equal to video output which is to be switched<br>(0 = to all the outputs) | 2, 15 |
| 2 | SWITCH AUDIO | Set equal to audio input which is to be switched<br>(0 = disconnect) | Set equal to audio output which is to be switched<br>(0 = to all the outputs) | 2 |
| 3 | STORE VIDEO STATUS | Set as SETUP # | 0 - to store<br>1 - to delete | 2, 3, 15 |
| 4 | RECALL VIDEO STATUS | Set as SETUP # | 0 | 2, 3, 15 |
| 5 | REQUEST STATUS OF A VIDEO OUTPUT | Set as SETUP # | Equal to output number whose status is reqd | 4, 3 |
| 6 | REQUEST STATUS OF AN AUDIO OUTPUT | Set as SETUP # | Equal to output number whose status is reqd | 4, 3 |
| 7 | VIS SOURCE | Set as input # when OUTPUT byte = 6;<br>OR<br>set as output # when OUTPUT byte = 7;<br>OR<br>set as blank period (in steps of 25ms) when OUTPUT byte = 32;<br>OR<br>set = 0. ***** | 0 - No VIS (immediate)<br>1 - Input # 1<br>2 - External digital sync<br>3 - External analog sync<br>4 - Dynamic sync<br>5 - Inter-machine sync<br>6 - Input # (INPUT byte)<br>7 - Output #(INPUT byte)<br>8 - User-defined sync<br>32 - RGBHV seamless switching<br>64 - Set for delayed switch<br>65 - Execute delayed switch<br>66 - Cancel delayed switch setting | 2, 5, 17, 18 |
| 8 | BREAKAWAY SETTING | 0 | 0 - audio-follow-video<br>1 - audio breakaway | 2 |
| | | 1 | 0 - FOLLOW mode<br>1 - Normal mode | 15 |
| 9 | VIDEO / AUDIO TYPE SETTING | 0 - for video | 0 - CV 4 - SDI<br>1 - YC 5 - CV+YC<br>2 - YUV 6 - VGA scaler<br>3 - RGBS 7 - DVI | 2 |
| | | 1 - for audio | O0=0 – Unbalanced audio<br>O0=1 – Balanced audio<br>O1=0 – Digital audio<br>O1=1 – Analog audio<br>O4=0, O3=0, O2=0-Mono<br>O4=0, O3=0,O2=1-Stereo | |
| | | 2 - for VGA and DVI | 1 - 640X480<br>2 - 800X600<br>3 - 1024X768 | |
| 10 | REQUEST VIS SETTING | Set as SETUP #, or<br>set to 126 or 127 to request if machine has this function | 0 - VIS source<br>1 - Input # or output # of source<br>2 - Vertical sync freq (Hz) | 3, 4, 6, 7 |
| 11 | REQUEST BREAKAWAY SETTING | Set as SETUP #, or<br>set to 126 or 127 to request if machine has this function | 0 - Request audio breakaway setting<br>1 - Request “FOLLOW” setting | 3, 4, 6, 15 |
| 12 | REQUEST VIDEO / AUDIO TYPE SETTING | Set as SETUP #, or<br>set to 126 or 127 to request if machine has this function | 0 - for video<br>1 - for audio<br>2 - for VGA | 3, 4, 6 |
| 13 | SET HIGHEST MACHINE ADDRESS | 0 - for video<br>1 - for audio | Set equal to highest machine address | 2 |
| 14 | REQUEST HIGHEST MACHINE ADDRESS | 0 - for video<br>1 - for audio | 0 | 4 |

| INSTRUCTION | | DEFINITION FOR SPECIFIC INSTRUCTION | | NOTE |
|---|---|---|---|---|
| # | DESCRIPTION | INPUT | OUTPUT | |
| 15 | REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED | SETUP #<br>or<br>Input # | 0 - for checking if setup is defined<br>1 - for checking if input is valid | 8 |
| 16 | ERROR / BUSY | For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5),<br>this byte is set as the input # | 0 - error<br>1 - invalid instruction<br>2 - out of range<br>3 - machine busy<br>4 - invalid input<br>5 - valid input | 9, 25 |
| 17 | RESERVED | - - - - | - - - - | 10 |
| 18 | RESET AUDIO | 0 | 0 | 1 |
| 19 | STORE AUDIO STATUS | Set as SETUP # | 0 - to store<br>1 - to delete | 2, 3 |
| 20 | RECALL AUDIO STATUS | Set as SETUP # | 0 | 2, 3 |
| 21 | SET VIDEO PARAMETER | Equal to input / output number whose video parameter is to be set (0 = all) | Set as parameter value | 2, 11, 24 |
| 22 | SET AUDIO PARAMETER | Equal to input / output number whose gain is to be set (0 = all) | Set as parameter value | 2, 11, 24 |
| 23 | INCREASE / DECREASE VIDEO PARAMETER | Equal to input / output number whose video parameter is to be increased / decreased (0 = all) | 0 - increase video gain<br>1 - decrease video gain<br>2 - increase contrast<br>3 - decrease contrast<br>4 - increase brightness<br>5 - decrease brightness<br>6 - increase colour<br>7 - decrease colour<br>8 - increase hue<br>9 - decrease hue<br>16 - increase H-phase<br>17 - decrease H-phase<br>18 - increase V-position<br>19 - decrease V-position | 24 |
| 24 | INCREASE / DECREASE AUDIO PARAMETER | Equal to input / output number whose parameter is to be increased / decreased (0 = all) | 0 - increase output<br>1 - decrease output<br>2 - increase left output<br>3 - decrease left output<br>4 - increase right output<br>5 - decrease right output<br>6 - increase input<br>7 - decrease input<br>8 - increase left input<br>9 - decrease left input<br>10 - increase right input<br>11 - decrease right input | 24 |
| 25 | REQUEST AUDIO PARAMETER | Equal to input / output number whose parameter is requested | 0 | 6, 24 |
| 26 | REQUEST VIDEO PARAMETER | Equal to input / output number whose video parameter is requested | 0 | 6, 24 |
| 30 | LOCK FRONT PANEL | 0 - Panel unlocked<br>1 - Panel locked | 0 | 2 |
| 31 | REQUEST WHETHER PANEL IS LOCKED | 0 | 0 | 16 |
| 32 to 35 | RESERVED | - - - - | - - - - | 10 |
| 40 | DIRECT MEMORY SAVE | Memory address | Data | 20 |

| INSTRUCTION | | DEFINITION FOR SPECIFIC INSTRUCTION | | NOTE |
|---|---|---|---|---|
| # | DESCRIPTION | INPUT | OUTPUT | |
| 42 | AUDIO PARAMETER SETTINGS FOR INSTRUCTIONS 22, 24, 25 | INPUT Bit:<br>I0 - 0=input; 1=output<br>I1 - Left<br>I2 - Right | 0 - Gain<br>1 - Bass<br>2 - Treble<br>3 - Midrange | 24 |
| 43 | VIDEO PARAMETER SETTINGS FOR INSTRUCTIONS 21, 23, 26 | 1 – Input<br>2 – Output | 0 - video gain<br>1 - contrast<br>2 - brightness<br>3 - colour<br>4 - hue<br>5 - H-phase<br>6 - V-position | 24 |
| 56 | CHANGE TO ASCII | 0 | 1 - SVS protocol<br>2 - Generic protocol | 19 |
| 57 | SET AUTO-SAVE | I3 - no save<br>I4 - auto-save | 0 | 12, 2 |
| 58 | EXECUTE LOADED DATA | Set as 0, or as SETUP #. | 1-Take<br>2-Cancel | 22, 3 |
| 59 | LOAD VIDEO DATA | Set equal to video input<br>(0 = disconnect)<br>(127 = load SETUP #) | Set equal to video output<br>(0 = to all the outputs)<br>or SETUP # | 22, 23 |
| 60 | LOAD AUDIO DATA | Set equal to audio input<br>(0 = disconnect)<br>(127 = load SETUP #) | Set equal to audio output<br>(0 = to all the outputs)<br>or SETUP # | 22, 23 |
| 61 | IDENTIFY MACHINE | 1 - video machine name<br>2 - audio machine name<br>3 - video software version<br>4 - audio software version<br>5 - RS422 controller name<br>6 - RS422 controller version<br>7 - remote control name<br>8 - remote software version<br>9 - Protocol 2000 revision | 0 - Request first 4 digits<br>1 - Request first suffix<br>2 - Request second suffix<br>3 - Request third suffix<br>10 - Request first prefix<br>11 - Request second prefix<br>12 - Request third prefix | 13 |
| 62 | DEFINE MACHINE | 1 - number of inputs<br>2 - number of outputs<br>3 - number of setups | 1 - for video<br>2 - for audio<br>3 - for SDI<br>4 - for remote panel<br>5 - for RS-422 controller | 14 |
| 63 | EXTENDED DATA | 7 MSBs for INPUT data | 7 MSBs for OUTPUT data | 20 |

NOTES on the above table:

**NOTE 1** - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

**NOTE 2** - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

**NOTE 3** - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

**NOTE 4** - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 80 85

would be HEX codes

4B 80 81 85

**NOTE 5** – For the OUTPUT byte set as 6, the VIS source is the input selected using the OUTPUT byte. Similarly, for the OUTPUT byte set as 7, the VIS source is the output selected using the OUTPUT byte. Note also, that on some machines the sync source is not software selectable, but is selected using switches, jumpers, etc!

**NOTE 6** – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A FE 80 81 (ie. request VIS setting, with INPUT set as $126_{dec}$)

would be HEX codes

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

**NOTE 7** – Setting OUTPUT to 0 will return the VIS source setting as defined in instruction #7. Setting to 1 will return the input # or output # of the sync source (for the case where the VIS source is set as 6 or as 7 in instruction #7). Setting to 2 returns the vertical sync frequency (0 for no input sync, 50 for PAL, 60 for NTSC, 127 for error).

**NOTE 8** - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

**NOTE 9** - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.

**NOTE 10** – This code is reserved for internal use.

**NOTE 11** – For machines where the video and / or audio gain is programmable.

**NOTE 12** - Under normal conditions, the machine's present status is saved each time a change is made. The "power-down" save (auto-save) may be disabled using this code. Note that whenever the machine is turned on, the auto-save function is set.

**NOTE 13** - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. $128_{dec}$+ $22_{dec}$ for 2nd byte, and $128_{dec}$+ $16_{dec}$ for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. $128_{dec}$+ $3_{dec}$ for 2nd byte, $128_{dec}$+ $5_{dec}$ for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. $128_{dec}$+ ASCII for "Y"; $128_{dec}$+ ASCII for "C").

**NOTE 14** - The number of inputs and outputs refers to the specific machine which is being addressed, *not* to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code

3E 82 81 82 (ie. request the number of outputs)

would be HEX codes

7E 82 90 82

ie. 16 outputs

**NOTE 15** – When the OVR bit (4th byte) is set, then the "video" commands have universal meaning. For example, instruction 1 (SWITCH VIDEO) will cause all units (including audio, data, etc.) to switch. Similarly, if a machine is in "FOLLOW" mode, it will perform any "video" instruction.

**NOTE 16** - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

**NOTE 17** – For clean switching of RGBHV video, the "seamless switching" option may be used. The blanking period for the transition of the RGB sources may be set in this case, in steps of 25 milliseconds.

For example, to set for 350ms blanking time (14 steps), send HEX codes

07 8E A0 81

**NOTE 18** – Delayed execution allows switching after a delay dictated by RS-232. To do this, the user sends instruction 7 with the "Set for delayed switch" option ($64_{dec}$) before sending the switch command (instruction 1) or pressing via front panel. The switch is not executed (unless timed-out) until the "Execute delayed switch" code is sent, or the "Set for delayed switch" code is sent again. (The mode is automatically cancelled after implementation of the switch if the "execute" command is used).
For example, to connect input 4 to output 3 after a delay, send HEX codes

| | | | | |
|---|---|---|---|---|
| 07 | 80 | C0 | 81 | (set for delayed switch) |
| 01 | 84 | 83 | 81 | (switch code) |

then, after the required delay, send HEX codes

| | | | | |
|---|---|---|---|---|
| 07 | 80 | C1 | 81 | (execute delayed switch) |

to implement the switch.

**NOTE 19** – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

**NOTE 20** – When data (ie. the INPUT and/or OUTPUT bytes) of more than 7 bits is required, this instruction is sent before sending the instruction needing the additional bits. The data in this intruction then becomes the Most Significant Bits of that next instruction. For example, to set the audio gain (instruction 22) of output 3 to $681_{dec}$ ($2A9_{hex}$), you would first send HEX codes

| | | | |
|---|---|---|---|
| 3F | 80 | 85 | 81 |

and then send HEX codes

| | | | |
|---|---|---|---|
| 16 | 83 | A9 | 81. |

To set the audio gain of output 6 to $10013_{dec}$ ($271D_{hex}$), first send HEX codes

| | | | |
|---|---|---|---|
| 3F | 80 | CE | 81 |

followed by HEX codes

| | | | |
|---|---|---|---|
| 16 | 86 | 9D | 81. |

**NOTE 21** – To store data in the non-volatile memory of the unit, eg. the EEPROM for saving SETUPS. The EEPROM address is sent using the INPUT byte, and the data to be stored is sent using the OUTPUT byte. To use this instruction, it is necessary to understand the memory map, and memory structure of the particular machine.

**NOTE 22** – Instruction 59 and instruction 60 load data for sending to the crosspoint switcher (or for storing in a SETUP), ie. the data is "lined-up" to be executed later. Instruction 58 executes the loaded data.

**NOTE 23** – If the INPUT byte is set as $127_{dec}$, then the data stored in a SETUP is loaded. The SETUP # is in the OUTPUT byte.

**NOTE 24** – Further information needed in instructions 21, 22, 25 and 26, is sent using instruction 42 – which is sent prior to the instruction. For example, to request the audio gain value of right input # 9, send hex codes

| | | | |
|---|---|---|---|
| 2A | 84 | 80 | 81 |

and then send HEX codes

| | | | |
|---|---|---|---|
| 19 | 89 | 81 | 81. |

**NOTE 25** – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).
For example, if input 3 is detected as invalid, the unit will send the HEX codes

| | | | |
|---|---|---|---|
| 10 | 83 | 84 | 81 |

If input 7 is detected as valid, then the unit will send HEX codes

| | | | |
|---|---|---|---|
| 10 | 87 | 85 | 81. |

**LIMITED WARRANTY**

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

**HOW LONG IS THE WARRANTY**

Labor and parts are warranted for three years from the date of the first customer purchase.

**WHO IS PROTECTED?**

Only the first purchase customer may enforce this warranty.

**WHAT IS COVERED AND WHAT IS NOT COVERED**

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed.
3. Damage, deterioration or malfunction resulting from:
   - i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   - ii) Product modification, or failure to follow instructions supplied with the product
   - iii) Repair or attempted repair by anyone not authorized by Kramer
   - iv) Any shipment of the product (claims must be presented to the carrier)
   - v) Removal or installation of the product
   - vi) Any other cause, which does not relate to a product defect
   - vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

**WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR**

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

**HOW YOU CAN GET WARRANTY SERVICE**

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

**LIMITATION OF IMPLIED WARRANTIES**

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

**EXCLUSION OF DAMAGES**

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.
**NOTE**: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.
This equipment has been tested to determine compliance with the requirements of:

| | |
|---|---|
| EN-50081: | "Electromagnetic compatibility (EMC);<br>generic emission standard.<br>Part 1: Residential, commercial and light industry" |
| EN-50082: | "Electromagnetic compatibility (EMC) generic immunity standard.<br>Part 1: Residential, commercial and light industry environment". |
| CFR-47: | FCC Rules and Regulations:<br>Part 15: "Radio frequency devices<br>Subpart B – Unintentional radiators" |

**CAUTION!**

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

**For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com, where updates to this user manual may be found**
**We welcome your questions, comments and feedback.**

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